



E5 QuiK-Lab

Advanced Thermal Analysis for Cast Iron

A dual-channel thermal analysis system featuring wireless connectivity, designed to ensure precise and reliable control of cast iron melt quality

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E5 QuiK-Lab Measuring System Overview

The QuiK-Lab® E5 is a next-generation thermal analysis system for cast iron, designed to deliver fast, accurate, and reproducible results during melting, treatment, and pouring. It evaluates the cooling behavior of molten iron using disposable QuiK-Cup® and TSH cups and calculates key metallurgical parameters in real time.

The QuiK-Lab® E5 can operate as a standalone thermal analysis instrument, providing real-time evaluation of cast iron melts during the production process. For extended data handling and advanced analysis, it can also be integrated into the MeltControl Foundry system.

Measurement values are displayed on an easy-to-read wide field of view LED RGB display. Depending on the selected QuiK-Cup, TSH Cup and operating mode, the QuiK-Lab® E5 provides the foundry operator with a comprehensive set of calculated metallurgical parameters:

- Liquidus temperature (TL) used to calculate
 - Carbon equivalent (CEL)
 - Saturation degree (SC)
- Solidus temperature (TS) used to calculate:
 - Silicon content (%Si)
 - Carbon content (%C)
- Eutectic temperature minimum (TEmin)
- Eutectic temperature maximum (TEmax)
- Recalescence (DTM)
- Undercooling (DT)
- End of freezing (TF)
- Peak temperature (TP)
- Graphitization Factor 1 (SF1)
- Graphitization Factor 2 (SF2)
- Nodularity Index (with TSH Cups)
- Inoculation Index (with TSH Cups)
- Mg Index (with TSH Cups)

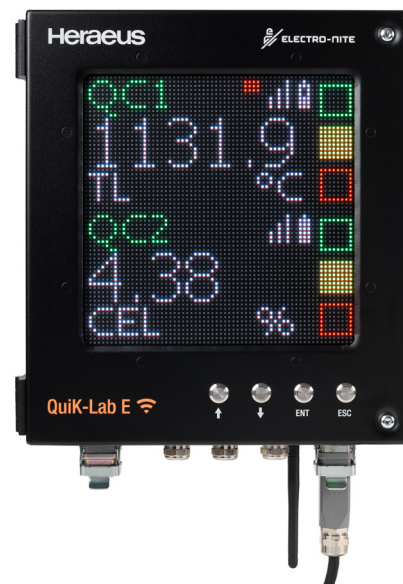
Setting Displays

The E5 QuiK-Lab has three digital displays and signal lamps:

- **Top Display:** Shows the temperature or result of the first channel (QC1 or TSH).
- **Bottom Display:** Shows the result of the second channel (QC2 or TSH)
- **Signal Lamps:** The three signal lamps indicate the measurement status of the instrument

In wireless mode, additional icons are shown:

- **RSSI Indicator:** Signal strength of the connected QUBE®
- **Battery Indicator:** Battery level of the QUBE®



MeltControl Foundry Integration

QuiK-Lab® E5 seamlessly integrates with **MeltControl Foundry**, a server-based software platform that collects and stores measurement data from multiple instruments (e.g., DigiTemp-E, QuiK-Lab® E5) across the foundry network. Cooling curves are visualized in a user-friendly interface and can be analyzed in detail for process optimization and traceability.

Operating Modes

When connected to MeltControl, QuiK-Lab® E5 supports four distinct operating modes:

Instrument Control

- Evaluation and calculation are performed entirely by QuiK-Lab® E5.

Half Control

- QuiK-Lab® E5 evaluates the cooling curve (e.g., TL, TS).
- MeltControl performs metallurgical calculations (e.g., CEL, %C, %Si).

Full Control

- QuiK-Lab® E5 acts only as a measurement interface.
- MeltControl handles both evaluation and calculation using proprietary algorithms.

TSH Mode – Dual Channel Measurement

- QuiK-Lab® E5 supports ThermoStack® (TSH) operation, enabling dual-channel thermal analysis using two QuiK-Cup® holders simultaneously.
- Ideal for comparative melt analysis.
- Each channel operates independently and provides full thermal analysis.
- Compatible with both wired and wireless configurations.
- Fully integrated with MeltControl for advanced data logging and visualization.



Meltcontrol Foundry interface

QuiK-Cup®

A QuiK-Cup® is a disposable measurement test cup that is securely attached to the contact block of the QuiK-Cup® holder. The system measures the cooling attributes of the molten iron poured into the QuiK-Cup®. Various types of QuiK-Cups® are available depending on measurement type and iron grade. They all play their part in the accurate, consistent, and quick measurement results that characterise the QuiK-Lab E® system.

Description

Thermal analysis is a quick, simple, reliable, and low-cost method for shop floor control of molten iron.

Based on the measurement of the temperatures at which the thermal arrests occur in the cooling curve of a solidifying iron sample, it is possible to accurately determine %CEL, %C, and %Si.

%Carbon equivalent, expressed by the formula

$\%CEL = \%C + \%Si/4 + \%P/2$, is directly related to the measured liquidus thermal arrest, which occurs as the molten iron sample begins to freeze.



%Carbon content determination

requires the knowledge of both liquidus and white eutectic or solidus arrest temperatures. Each pair corresponds to a unique value for carbon.

%Silicon content calculation

is possible through its relationship with the measured solidus temperature, corrected by a factor depending on the phosphorus content of the iron.

Features

- Solid, thick-walled cup with reliable contact arrangement assuring correct polarity
- Horizontal quartz-protected thermocouple with short response time QuiK-Cup® family QuiK-Cup®
- Wide pouring temperature range
- Reproducible and stable cooling curves
- High success rate
- Optimized volume resulting in fast cooling rate and minimal measurement time

Also possible

- Inoculation control by means of the eutectic undercooling measurement. This can be achieved by making use of the QCTCov cups.
- Evaluation algorithm for QCTCov cups for thermal analysis using MeltControl Foundry

Cups and Applications

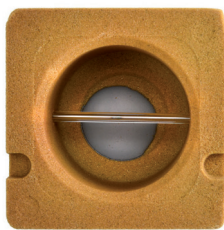
Cups with Tellurium (QCTe, QCTeS):

White solidification for %CEL, %C and %Si determination in both hypo- and slightly hypereutectic lamellar iron. QCTeS has additional sulphur for usage in magnesium treated cast iron (nodular and vermicular).

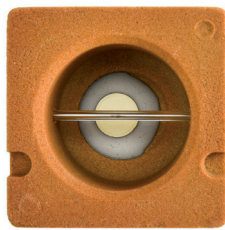
Cups without Tellurium (QC, QCTCov):

Grey solidification for CEL determination in hypo-eutectic iron and eutectic undercooling measurement. QCTCov has a reduced volume for a more pronounced undercooling. It has a fixed sample volume resulting in normalized cooling curves.

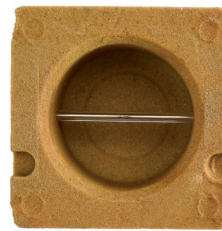
Due to the cover, the effect of the specific inoculation on the cast iron melt can be evaluated.



QCTe



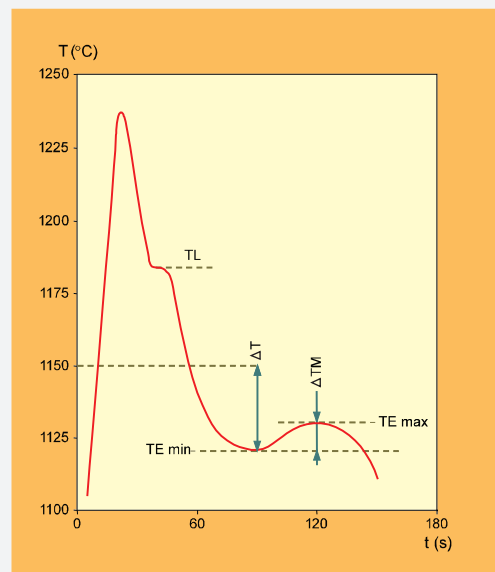
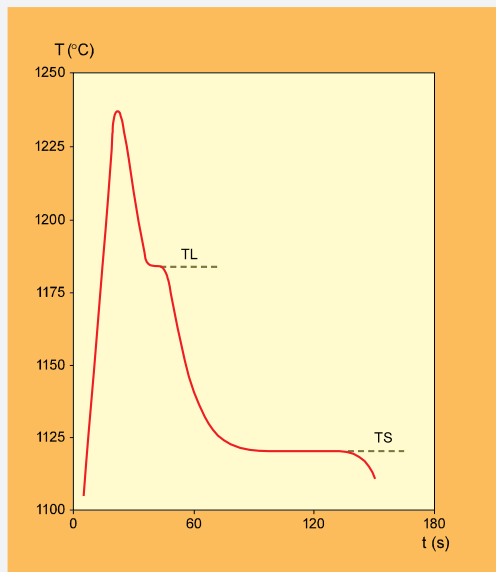
QCTeS



QC



QCTCov



QuikCup Mg System – Essential Control for Reliable Nodularity

The QuikCup Mg System provides a fast, reliable checkpoint to ensure that molten iron contains sufficient magnesium for spheroidal graphite formation, one of the most critical requirements in ductile iron production.

Why Magnesium Control Matters

Maintaining Mg levels within the optimal range (0.035–0.045 wt%) is essential for achieving proper nodule formation.

- Below 0.035% Mg → Graphite solidifies as flakes or vermicular shapes, reducing strength and ductility.
- Within range → Stable nodule formation and consistent mechanical properties.

How MgCup Works

The MgCup contains precisely controlled additions of sulfur (S) and tellurium (Te):

- Sulfur is dosed stoichiometrically to bind exactly the Mg required for 0.035 wt%.
- Tellurium suppresses graphite formation and promotes white solidification.

This setup creates a simple, decisive result:

PASS → Iron contains more than 0.035% Mg; Mg overrides Te and graphite forms.

FAIL → Mg is below 0.035%; S binds all available Mg and Te forces white solidification.

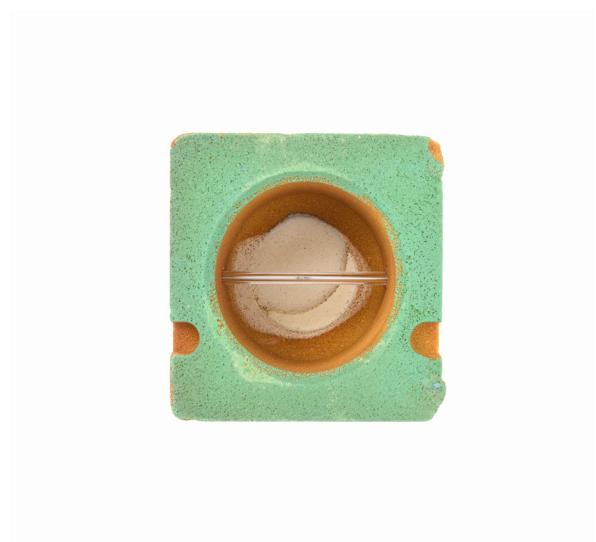
What MgCup Is (and Isn't)

MgCup is a process control tool, not a microstructure or property predictor.

- It does not measure nodularity, Mg-index or mechanical properties.
- It does confirm whether the melt has been treated with enough Mg alloy to produce ductile iron.

Your Go/No-Go Assurance

With its simple PASS/FAIL mechanism, the QuikCup Mg System ensures confidence in every treatment step, helping operators verify Mg adequacy before pouring and preventing costly casting defects.

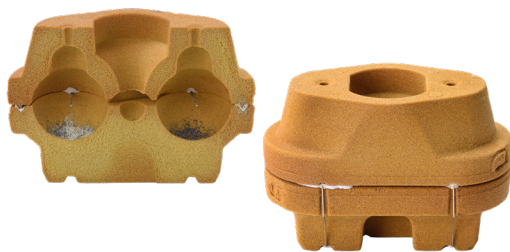


TSH Cup: Redefining Quality Control in Iron Casting

Unlock the future of foundry excellence with TSH Cup—the ultimate solution for rapid, reliable quality evaluation in Ductile and Vermicular Iron production. Engineered for precision, TSH Cup empowers you to predict microstructure and mechanical properties before casting is complete, giving you unmatched control over your process.

Why Choose TSH Cup?

- Speed & Accuracy – Get instant insights into critical metallurgical parameters.
- Confidence in Every Pour – Predict outcomes and eliminate costly surprises.
- Optimized Performance – Reduce waste, cut costs, and boost productivity.



TSH Cup with Sulphur and Inoculation



TSH Cup with Sulphur and without Inoculation

Core Features That Drive Results

- Inoculation Index – Inoculation efficiency control and minimizing carbide risk and improve graphite morphology for microstructures.
- Nodularity Index – Ensure optimal nodularity for strength and durability.
- Magnesium Index – Maintain stability and consistency in every melt.
- TSH Cup enables clear comparison of melt conditions such as TSH with sulphur & without inoculant, TSH after inoculation processes, and TSH with inoculant & sulphur before inoculation process, giving foundries precise visibility into treatment performance.

The Power of Integration

Pair TSH Cup with Melt Control Foundry for a fully integrated solution that guarantees:

- Process Stability
- Cost Optimization
- Consistent, High-Quality Castings

TSH Cup isn't just a tool, it's your competitive edge. Take control of your foundry process today and deliver excellence with confidence.



TSH Cup holder wireless version

Process	Cup Type	Monitoring Parameters
Melting Monitoring	QC-TE	CEL
		% C
		% Si
	QC	CEL
		Liquidus Temperature
		Eutectic Undercooling
Treatment and Pouring Monitoring	QC-TeS	Eutectic Recalescence
		CEL
		% C
	QCTCov	% Si
		CEL
		Liquidus Temperature
		Eutectic Undercooling
		Eutectic Recalescence
	QC Mg	Mg Adequacy (Pass/Fail)
	TSH	CEL
		Liquidus Temperature
		Eutectic Undercooling
		Eutectic Recalescence
		Nodularity/Mg-Index
		Inoculation Index



Technical data

QuiK-Lab® E5 / QuiK-Cup® Measuring System

Item	Item Description
Measurement input	Type K (NiCr–Ni), measurement range: 400 °C – 1370 °C
Displays	RGB LED MATRIX 64 X 64 with 2.5mm pitch
Reference temperature	Cold Junction Temperature (CJT), displayed when instrument is ready
Accuracy	+/- 0.5°C For ambient temperature between 0 and 50°C
Signal Outputs	Optional 4 SSR for horn
Power Supply	100–240VAC 1A MAX 50/60 Hz
Power Consumption	Max. 34 VA
Communication Interfaces	Ethernet (TCP/IP), optional: Profibus/Profinet/Modbus/Ethernet-IP, RS-232, TTY, SSR, mAout
Environmental protection	Metal housing, IP20 protection
Dimensions (HxWxD)	310 × 275 × 191 mm
Weight	Approx. 7.5 kg
Options	Optional communication boards (Profibus, Profinet, Modbus RTU/TCP, TTY, RS-232, Ethernet-IP), remote display (RD231/RD251), wireless QUBE® module, SSR card with 4 outputs
Storage	SD-card
Additional Features	Wireless operation with QUBE®, automatic cup detection, magnesium monitor, MeltControl integration, IP20 protection
Pollution Degree of the intended environment	PD2
Location use	Indoor use
Operating Ambient Temperature Range	-10°C to 55°C
Operating Humidity Range	0 to 90 % RH non condensing
Operating Altitude	up to 2000 m

Ordering information

Cups

Item	
Cups with Tellurium (50 in a pack) QuiK-Cup® with Te QuiK-Cup® with Te + S	QCTe QCTeS
Cups without Tellurium (50 in a pack) QuiK-Cup® without Te	QC
Cups with Thin Volume (30 in a pack) QuiK-Cup® with thin volume and Cover	QCTCov
QuiK-Cup Mg - (50 in a pack)	Qc Mg
Double Cup TSH SGI (with Sulphur without Inoculant) SGD (40 in a pack)	TSH
Double Cup TSH SGI (with Sulphur and Inoculant) SGDI (40 in a pack)	TSH

Spoons

Item	
Large pouring spoon AES (400cc)	10899861
Small pouring spoon AES (150cc)	10899961

Hardware for wired and wireless system QC

Item	
QuiK-Cup® Holder (complete) (wired)	10801261
QuiK-Cup® stand- (wireless)	20847762
QUBE KIT K2 (Wireless)	31010002

Hardware for wired and wireless system TSH

Item	
TSH Cup Holder with wire	10801261
QUBE 4PIN incl. battery (TSH)	39000524
TSH Cup Holder wireless	20869161
POWER PACK V2 (EU)	31970021
QUBE CHARGING STATION V2	31010018

QuiK-Lab E®

Item	
E5 QuiK-Lab E® instrument	31010053

Heraeus Electro-Nite

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